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> The function of education is to teach one to think intensively and to think critically Intelligence plus character—that is the goal of true education

CSIR NET - GENERAL APTITUDE

QUANTITATIVE APTITUDE

L-2 Missing series

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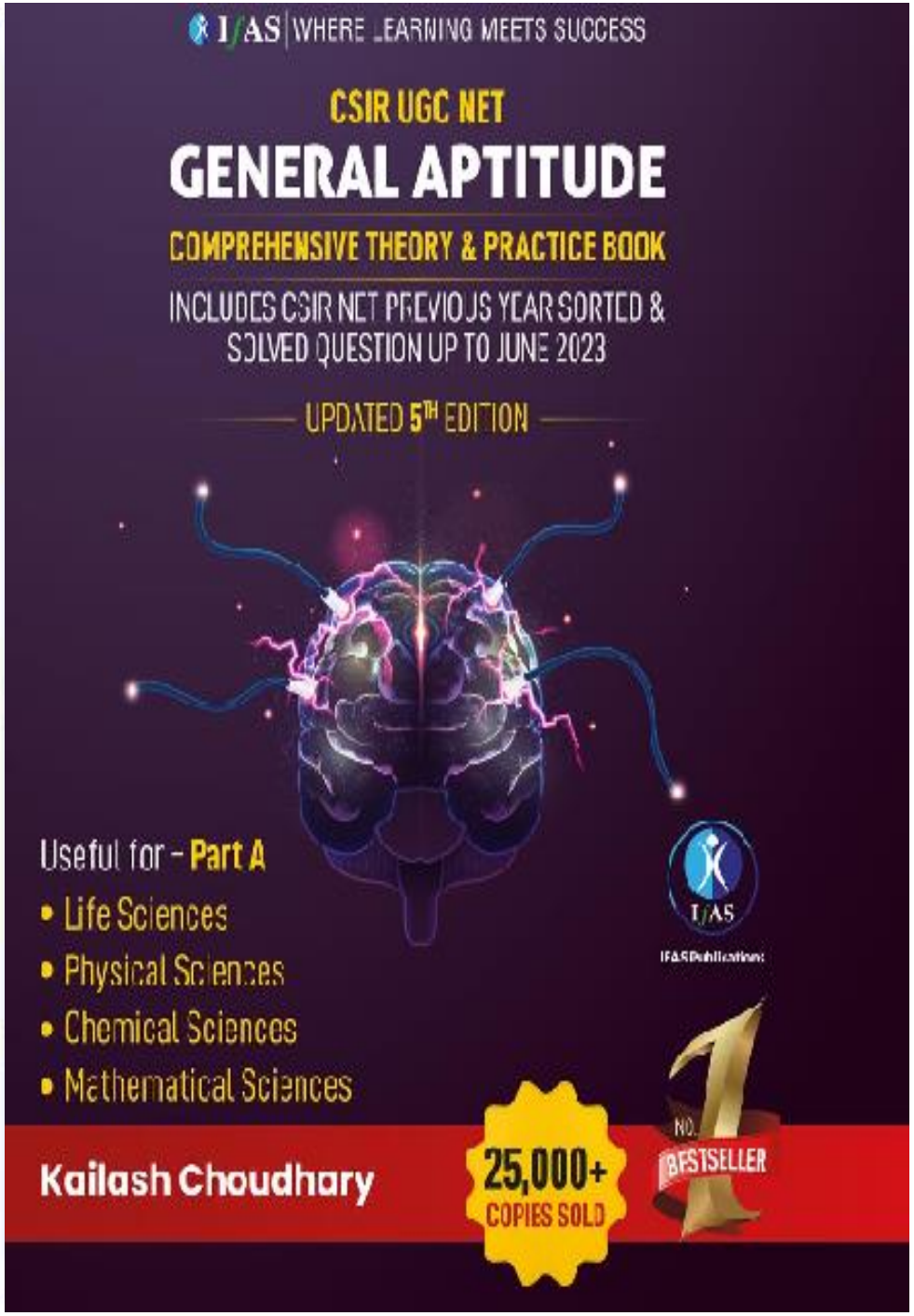


Topic Covered in Today's Session

1. Types of number series
2. Practice questions
3. Miscellaneous questions

If $4^{(x-y)} = 64$ *and* $4^{(x+y)} = 1024$, then find the value of x.

1. 3
2. 1
3. 6
4. 4

$4^{x-y} = 4^3$

$x - y = 3$

1024

$4^{x+y} = 4^5$

$x + y = 5$

$x - y = 3$

$2x = 8$

$x = 4$

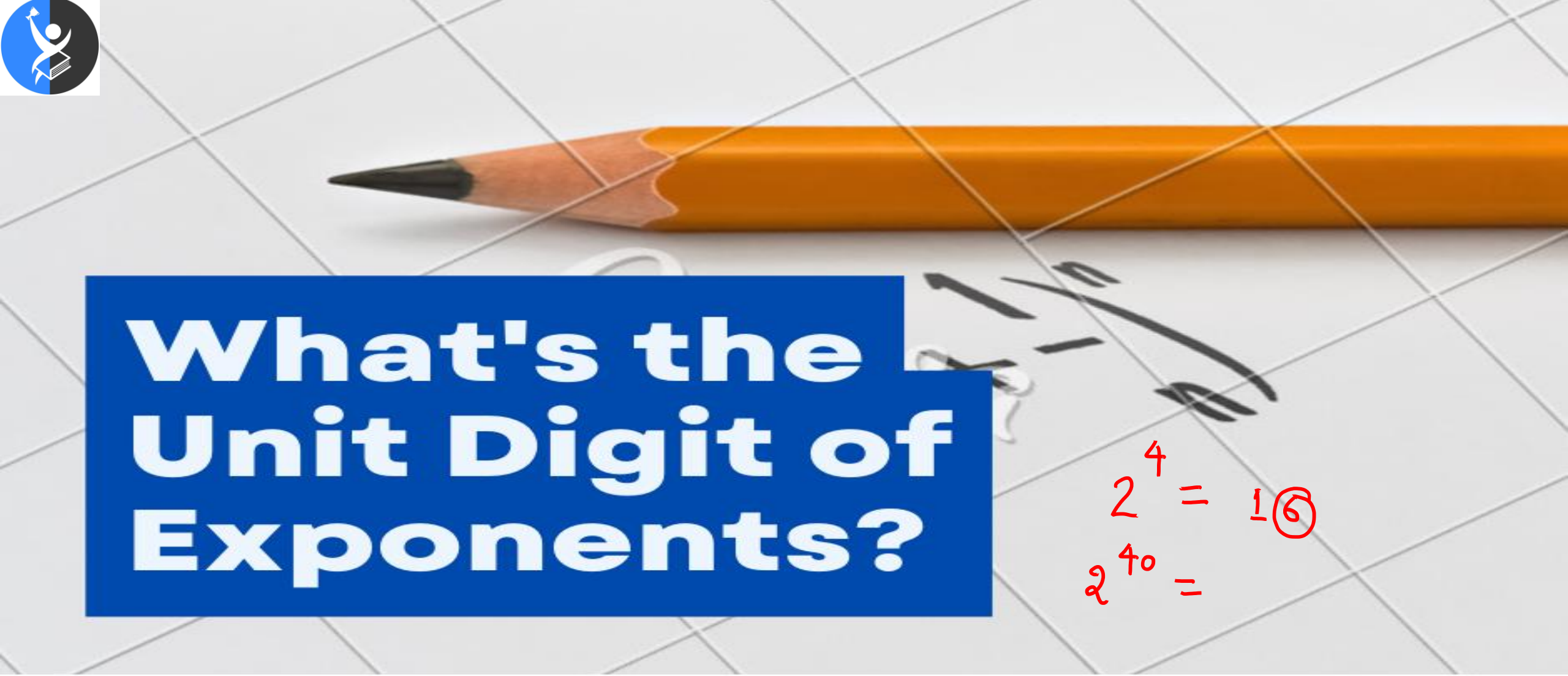
Given that $a \neq b$ and $a, b > 0$, and $\frac{a^{n+2}+b^{n+2}}{a^n+b^n} = ab$ then $n =$ **(PYQ)**

1. 1
2. $\frac{1}{2}$
3. $\frac{-1}{2}$
4. -1

(1) $\frac{a^3+b^3}{a+b} = ab$

(4) $n = -1$

$\frac{a^1+b^1}{a^{-1}+b^{-1}} = \frac{a+b}{\frac{1}{a}+\frac{1}{b}} = \frac{a+b}{\frac{b+a}{ab}} = ab$



Learn how to find the unit digit with our step-by-step guide.

NUMBER	CYCLICITY	POWER CYCLE
1	1	1
2	4	2,4,8,6
3	4	3,9,7,1
4	2	4,6
5	1	5
6	1	6
7	4	7,9,3,1
8	4	8,4,2,6
9	2	9,1
~~10~~	~~1~~	~~0~~

$3^1 \rightarrow 3 \rightarrow 3$
$3^2 \rightarrow 9 \rightarrow 9$
$3^3 \rightarrow 27 \rightarrow 7$
$3^4 \rightarrow 81 \rightarrow 1$
$3^5 \rightarrow 243 \rightarrow 3$
$3^6 \rightarrow 729 \rightarrow 9$
$3^7 \rightarrow 2187 \rightarrow 7$
$\rightarrow 1$

$4^1 \rightarrow 4 \rightarrow 4$
$4^2 \rightarrow 16 \rightarrow 6$
$4^3 \rightarrow 64 \rightarrow 4$
$4^4 \rightarrow 256 \rightarrow 6$

$5^1 \rightarrow 5$
$5^2 \rightarrow 25$
$5^3 \rightarrow 625$

$6^1 \rightarrow 6$
$6^2 \rightarrow 36$
$6^3 \rightarrow 216$

$2^1 \rightarrow 2 \rightarrow 2$

$2^2 \rightarrow 4 \rightarrow 4$

$2^3 \rightarrow 8 \rightarrow 8$

$2^4 \rightarrow 16 \rightarrow 6$

$2^5 \rightarrow 32 \rightarrow 2$

$2^6 \rightarrow 64 \rightarrow 4$

$2^7 \rightarrow 128 \rightarrow 8$

$2^8 \rightarrow 256 \rightarrow 6$

What is the last digit of 63^{139} ?

(1) 1
(2) 3
(3) 7
(4) 9

Power

Power cycle = 3

9
7 Ans
1

Cyclicity ⇒ 4 | 139 | 34
12
19
16
3rd Rem.

3
9
7
1

3, 2, 1, 0

Last power cycle

100

63 | 4 | 100 | 25
8
20
20
0

1 Ans

What is the last digit of 77^{49} ?

(1) 1
(2) 3
(3) 7
(4) 9

7^{49}

Cyclicity

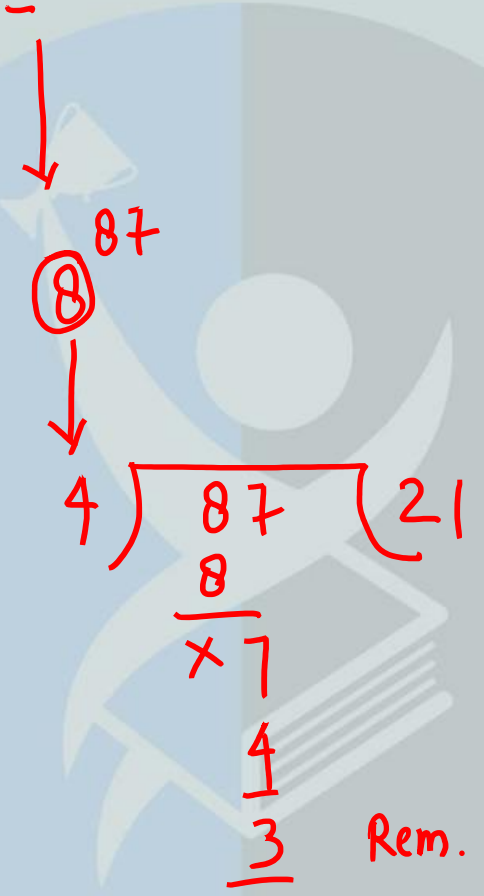
4 | 49 | 12

4
× 9
8
1 Rem.

7 Ans

What is the last digit of 148^{87} ?

(1) 1 (2) 3 (3) 2 (4) 6



$8^1 \rightarrow 8$

$8^2 \rightarrow 4$

$8^3 \rightarrow 2$

8
4
2 Ans

What is the last digit of 2017^{2017} ?

(1) 1 (2) 3 (3) 7 (4) 9

MISSING SERIES

Types of number series

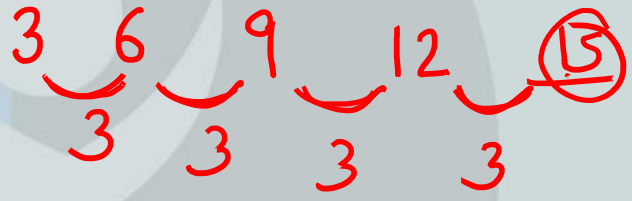
Arithmetic Series: (+, −)

Successive numbers are obtained by adding or subtracting a fixed particular number to or from the preceding number.

Examples:

Increasing series

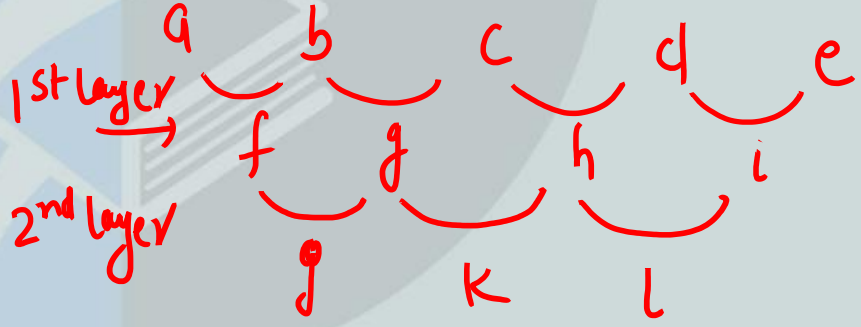
3, 5, 7, 9, 11…… (common difference: +2)



Decreasing series

28, 25, 22, 19, 16… (common difference: -3)

3 3 3 3



Geometric Series:

× OR ÷

Successive number is identified by multiplying or dividing a fixed number (can be fraction also) by the preceding number. This fixed number is called the common ratio of the geometric series.

Examples:

3, 9, 27, 81, 243..? (multiply by 3)

×3 ×3 ×3 ×3

1/5, 1/30, 1/180, ? (multiply denominator by 6)

$\frac{1}{180 \times 6} = \frac{1}{1080}$

200, 20, 2, 0.2… (divide by 10)

$-14 \times -2 = +28$

7, -14, 28, -56, 112, -224 (multiply by -2)

×-2 ×-2 ×-2

Arithmetico-Geometric Series:

(+/-) → (×/÷)

Each successive term is formed by first adding a fixed number to the preceding term and then multiplying (or dividing) it by some other fixed number.

Examples:

1 , 50 , 540 , 5440 ... ? (add 4 and multiply 10)

+4 = 5 × 10 = 50

54440

1 , 9 , 33 , 105 .... (add 2 and then multiply 3)

+2

3 × 3

9 + 2 = 11 × 3

107 × 3

= 321 Ans

(×/÷) → (+/−)

Geometrico-Arithmetic Series

Each successive term is formed by first multiplying (or dividing) a fixed number to the preceding term and then adding it by some other fixed number.

Examples:

4, 10, 22, 46, 94…. (multiply by 2 and then add 2)

188 + 2 = 190

2 , 5 , 17 , 65 … (multiply by 4 & then subtract by 3)

(×4 −3)

260 − 3 = 257

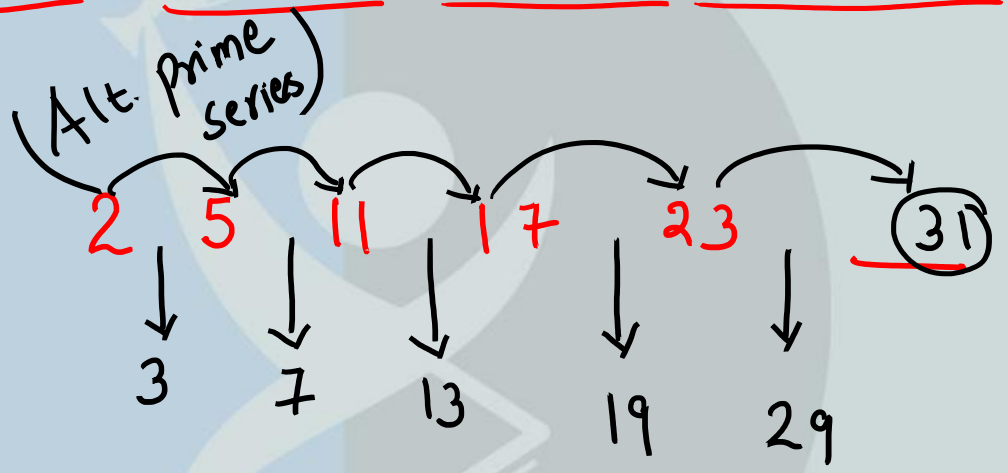
Prime Series:

The number that can be divided only by one and the number itself are called prime numbers.
The prime sequence is a string of prime numbers starting with any of the prime numbers.

Examples:

5, 7, 11, 13, 17, 19.. 23

23, 29, 31, 37, 43.. 47



Power Series:

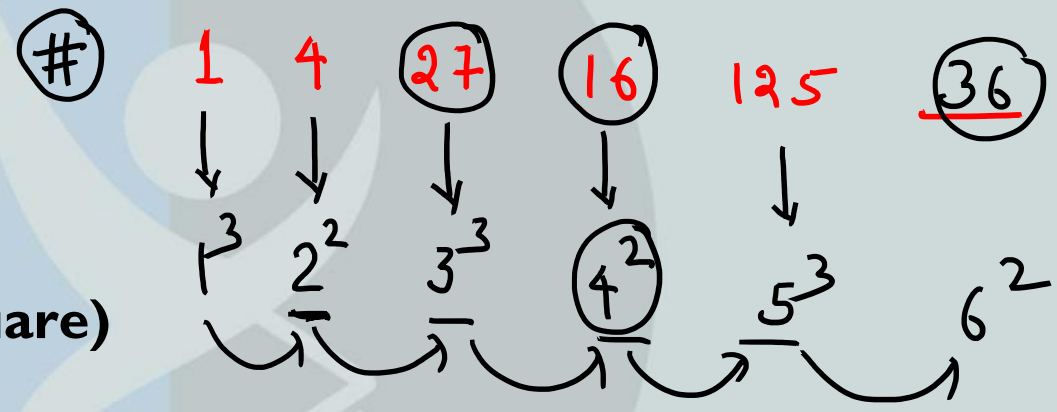
Every number is the nth power of some successive numbers. This number can be square, cube or any higher powers of a particular string of numbers.

Examples:

1, 2, 3, 4, 5…. – 1st power series

1, 4, 9, 16, 25…. 36 – 2nd power series (square)

$1^2\ 2^2\ 3^2\ 4^2\ 5^2\ 6^2$



Twin Series:

This series has two series combined together to form one series. This series can be of any type among those mentioned above.

Examples:

1, 3, 2, 5, 3, 7, 4, 9… 5 11

2, 5, 4, 15, 8, 45, 16… 135, 32

×2 ×2 ×2 ×2

×3 ×3 ×3

Fibonacci Series:

The first two terms are 1, 1 and each succeeding term is the sum of the previous two numbers.

That is, 1, 1, 2, 3, 5, 8, 13, 21… (34)

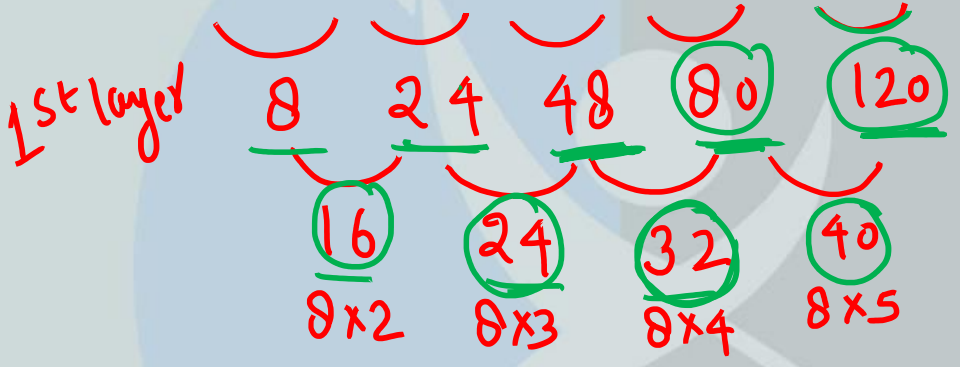
1 1 2 3 5 8 13 21

2+1=3, 3+2=5, 5+3=8, 8+5=13, 13+8=21

Practice questions

Q1. 17, 25, 49, 97, 177, ?

297



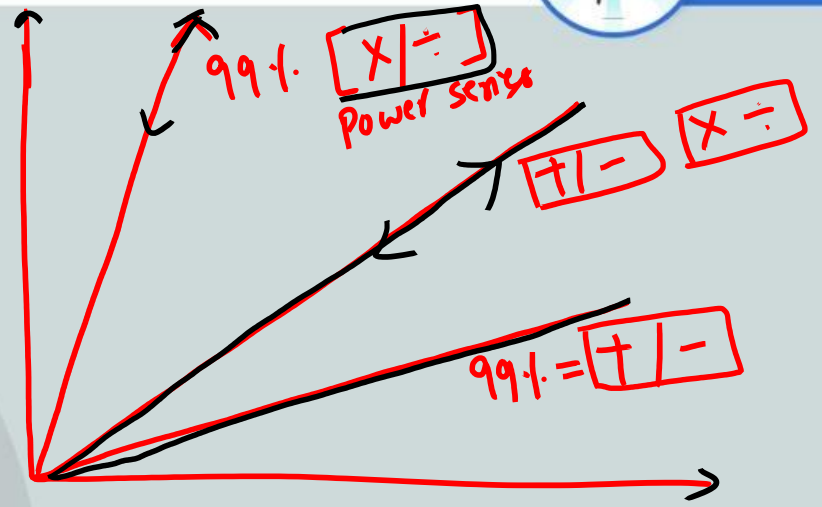
1) 297
2) 247
3) 358
4) 292

Q2. 3, 12, 48, 192, 768, ?

3072

×4 ×4 ×4 ×4 ×4

1) 3132
2) 3072
3) 3060
4) 3020



Q3. 4, 31, 15, 140, 104, ? 447

+27 −16 +125 −36 +343

$+3^3$ -4^2 $+5^3$ -6^2 $+7^3$

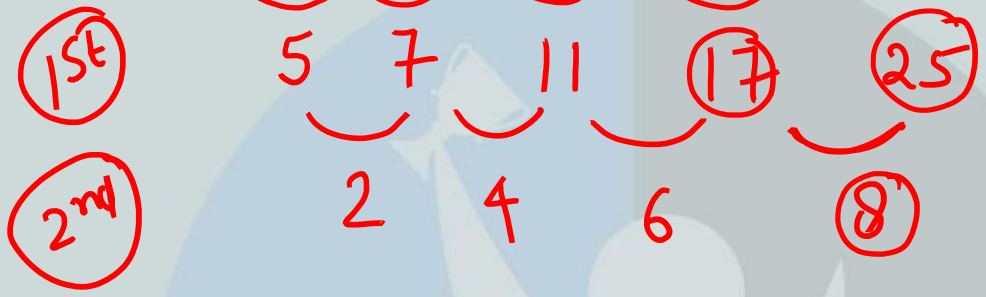
1) 445
2) 413
3) 421
4) 447

Q4. 1, 4, 27, 16, 125, 36, ? 343

1^3 2^2 3^3 4^2 5^3 6^2 7^3

1) 343
2) 445
3) 49
4) 729

Q5. 1, 6, 13, 24, 41, ? 66



1) 77
2) 62
3) 66
4) 64

Q6. 2, 5, 16, 65, 326, ? 1957 = 1956 + 1

(×2+1) (×3+1) (×4+1) (×5+1) (×6+1)

1) 1957
2) 1987
3) 1972
4) 1886

Q7. 49, 81, 121, 169, 225, 289, ? 361

7^2 9^2 11^2 13^2 15^2 17^2 19^2

1) 361
2) 441
3) 324
4) 625

Q8. 7, 16, 141, 190, 919, ?

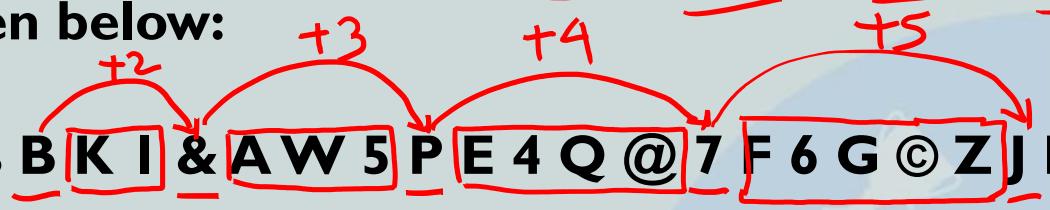
1040

9 125 49 729 121

3^2 5^3 7^2 9^3 11^2

1) 1029
2) 1019
3) 1020
4) 1040

Q9. Study the following digit-letter-symbol sequence carefully and answer the questions given below:



C % B K I & A W 5 P E 4 Q @ 7 F 6 G © Z J L 2 € D ¥ M # 8

What should come in place of question mark in the following on the basis of above sequence?

B, &, P, 7, ?

(a) #
(b) M
(c) D
(d) J

Q10. Read the following character sequence carefully and then answer the question given below it.

4 B @ # P W 3 $ 5 % T & 7 8 C F E * © A K 2 U D + ¥ R

What will come in place of the question mark of the series?

BP@ $T5 8EC ?

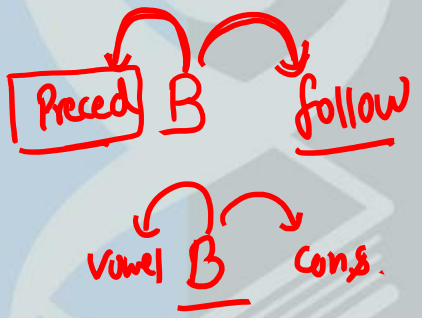
(a) U D +
(b) AUK
(c) © A K
(d) AD2

Q11. Study the following alphabetical sequence and answer the questions following it.

A B B C D E F E D B C A F E C B B A C A O B N U V W

How many B's are there in the alphabetical series which are immediately preceded by a vowel and immediately followed by consonant?

(a) One
(b) Two
(c) Three
(d) More than three



Q12. Study the following alphabetical sequence and answer the questions following it.

A B B C D E F E I B C A F E C B B A C A O B N U V W

How many consonants are there in the alphabetical series which are immediately preceded by a Vowel?

Vowel Cons

(a) One
(b) Two
(c) Four
(d) More than Five

Q13. Study the following arrangement carefully and answer the questions given below:

3 1 2 5 4 7 2 8 4 5 7 1 9 6 5 2 4 1 4 5 8 2 4 3 9 7 6 9 4 2 3

How many odd numbers are there in the given series which are immediately followed by a perfect square digit?

odd → Perfect square

1 → 1^2

4 → 2^2

9 → 3^2

(a) One
(b) None
(c) Three
(d) Seven

Q14. In the following finite sequence of integers, how many terms are divisible by their immediate next terms ?

8, 3, 4, 9, 3, 5, 9, 5, 9, 9, 9, 4, 5, 6, 3, 3, 5, 7, 2, 3, 9, 9

$\frac{9}{3} = 3$ $\frac{9}{9} = 1$ $\frac{3}{9} = \frac{1}{3}$

1. 7
2. 4
3. 5
4. 6

Q15. In the following finite sequence of integers, how many 9s are divisible by the integers immediately preceding them ?

8,3,4,9,3,5,9,5,9,9,9,4,5,9,5,6,3,3,5,7,2,3,9,9,8,9,3,9,1,9,4

$\frac{9}{3}=3$ $\frac{9}{1}=9$

1. 7
2. 4
3. 5
4. 6

Q16. Study the following arrangement carefully and answer the questions given below:

3 1 2 5 4 7 2 8 4 5 7 1 9 6 5 2 4 1 4 5 8 2 4 3 9 7 6 9 4 2 3

How many 2's is there in the given series which are followed by a number less than 6?

(a) One
(b) None
(c) Three
(d) More than three

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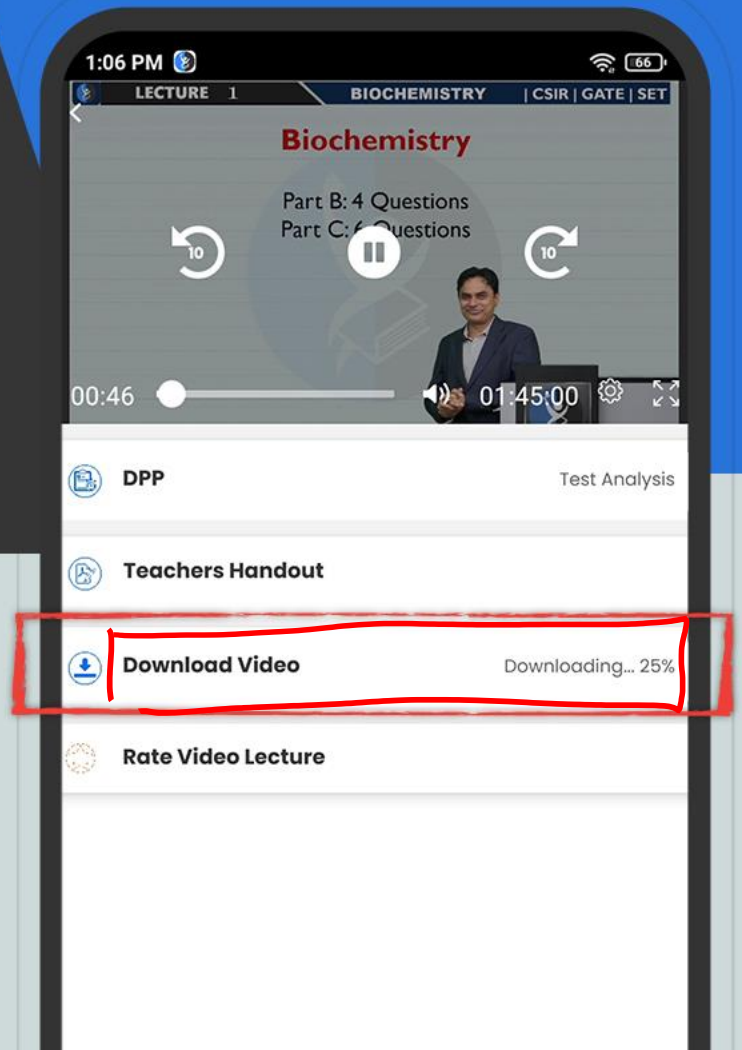

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